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would now afford their entomologist, Miss Ormerod, an opportunity for directing a series of comparative experiments to test the truth of these beliefs.

The report is well illustrated, partially by some of the well-known figures of Curtis, and partially by original figures drawn by the authoress.

WEEKLY SUMMARY OF THE PROGRESS OF SCIENCE.

MATHEMATICS.

The elliptic differential equation.—M. Rud. Sturm has here given a method of integration for the general elliptic differential equation $\frac{dx}{\sqrt{X}} \pm \frac{dy}{\sqrt{Y}} = 0$,

where X and Y are quartic functions of x and y respectively, say, $X = E(x-a)(x-b)(x-c)(x-d)$, and Y a similar function of y . He shows that this equation can be integrated directly by aid of an integrating factor which he determines. Denoting by $X_{ab} \dots Y_{ab} \dots$ the products of two of the factors $x-a, x-b \dots, y-a, y-b \dots$, then

the left-hand side of the equation $\frac{dx}{\sqrt{X}} \pm \frac{dy}{\sqrt{Y}} = 0$ is made the exact differential of

$$\frac{1}{x-y} \left\{ \sqrt{X_{ab}Y_{cd}} \mp \sqrt{X_{cd}Y_{ab}} \right\}$$

by multiplying it by the quantity

$$\frac{1}{(x-y)^2} \left\{ \left[\frac{1}{2}(x+y)(a+b) - xy - ab \right] \sqrt{X_{cd}Y_{ab}} \right. \\ \left. \mp \left[\frac{1}{2}(x+y)(c+d) - xy - cd \right] \sqrt{X_{ab}Y_{cd}} \right\}.$$

—(*Math. ann.*, xxi.) T. C. [238]

PHYSICS.

Electricity.

Efficiency of telephones.—K. Vierordt measures the weakening of sound through telephones by diminishing the sound at the transmitter until it just becomes inaudible at the other end. The sound is measured by the mass and height of a small leaden sphere, which is dropped upon a tin plate. Using two Siemens-Halske telephones, of 205 and 208 S. U. resistance respectively, he found that the loss over thirty-four m. of wire was less than seventy-five per cent of the loss in air. —(*Ann. phys. chem.*, xix. 207.) J. T. [239]

Electric lighting.—Ganz & Co. of Budapest find, that, with a continuous current, the carbon filament of an incandescent lamp gives out first at the end where the positive current enters, a spot of carbon being deposited on the neighboring part of the glass. If alternating machines are used, the life of the lamp is almost exactly doubled, and when the deposit forms it is all around the case. —(*Engineering*, June 15.) J. T. [240]

ENGINEERING.

A great 'Sound steamer.'—The steamer Pilgrim, of the Old Colony steamship company, was recently added to the fleet now plying through Long

Island Sound. The vessel is the largest and the most expensively fitted up of all steamers which have yet been built for those waters. The hull is of iron, double, and built in compartments. The boiler space is so enclosed by iron bulkheads that the danger of fire is wholly avoided. The engines are of the standard beam-engine type, and fitted with the Stevens valve-gear. They were designed by Messrs. Fletcher & Harrison, and built by Messrs. John Roach & Son. The steering is done by means of a Sickles steam steering gear, and the lighting is performed by Edison dynamos. The hull is 390 feet long on deck, 375 on the load line; the beam is 50 feet over the hull and 87.6 feet over the 'guards;' the depth of hold is 18.6 feet; draught of water, 11 feet. The engine has a steam-cylinder 110 inches in diameter and 14 feet stroke of piston. There are 12 boilers of steel, and calculated for a pressure of 50 pounds per square inch. The total power is estimated at 5,500-horse power. The wheels are of the radial type, and are 41 feet in diameter, weighing 85 tons each. The shafts are 26 inches in diameter. The cylinder weighs 30 tons; the bed-plate, 30 tons; the beam, 33 tons; the condenser, 60 tons. The machinery will weigh, altogether, with water in the boilers, 1,365 tons. There are 103 water-tight compartments; and it is considered that it will be impossible to sink the vessel by collision or grounding. There are 912 electric lamps operated by two Edison dynamos of a total of 11,400-candle power. They are driven by an Armington & Sims engine, built at Providence, of 150-horse power. The grand saloon is the largest in the world: it is 350 feet long, and accommodates 1,400 passengers, for whom state-rooms are provided. —(*Sc. Amer.*, June 30.) R. H. T. [241]

CHEMISTRY.

(General, physical, and inorganic.)

Apatites containing iodine.—In continuing the study of the formation of artificial apatites, A. Ditte fused baric iodide with a mixture of sodic iodide and ammonic phosphate, the latter in small quantity. On slow cooling, the mass crystallized in hexagonal prisms of the composition $\text{BaI}_2 \cdot 3 \text{Ba}_3(\text{PO}_4)_2$. When ammonic arseniate was substituted for the phosphate, the corresponding iodarseniate, $\text{BaI}_2 \cdot 3 \text{Ba}_3(\text{AsO}_4)_2$, was formed. The iodovanadate, $\text{BaI}_2 \cdot 3 \text{Ba}_3(\text{VO}_4)_2$, crystallized in transparent prisms. The strontium compounds, $\text{SrI}_2 \cdot 3 \text{Sr}_3(\text{PO}_4)_2$, and $\text{SrI}_2 \cdot 3 \text{Sr}_3(\text{AsO}_4)_2$, and calcic iodovanadate, $\text{CaI}_2 \cdot 3 \text{Ca}_3(\text{VO}_4)_2$, were obtained. —(*Comptes rendus*, xcvi. 1226.) C. F. M. [242]

The spectrum of beryllium.—Mr. H. N. Hadley finds that the spectrum of beryllium shows no marked analogy with the spectrum of calcium, mag-

nesium, or aluminum. It does not resemble the spectrum of carbon, boron, or silicon; but it is more closely allied to that of lithium. The author therefore concludes that it is the first member of a dyad series of elements homologous to calcium, strontium, and barium. — (*Journ. chem. soc.*, June, 1883.) C. F. M.

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Decomposition of water by the metalloids. — When distilled water is boiled with sulphur, C. Z. Cross and A. F. Higgin find that it is decomposed according to the equation $2\text{H}_2\text{O} + 3\text{S} = 2\text{H}_2\text{S} + \text{SO}_2$. They also noted that sulphur distilled with steam or with the vapor of dilute alcohol. On boiling arsenic with water, it was converted into arsenious acid and hydric arsenide. Arsenious sulphide was changed into a sulfoxy-compound. — (*Berichte deutsch. chem. gesellsch.*, xvi. 1195.) C. F. M.

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Pyronome. — This is the name given by M. Sandoy to a new explosive, consisting of sixty-nine parts of saltpetre, nine of sulphur, ten of charcoal, eight of metallic antimony, five of potassium chlorate, four of rye-flour, and a very small quantity of potassium chromate. The materials are mixed with an equal quantity of boiling water, and the mass is evaporated to a paste, dried, and powdered as wanted. This mixture is said to be much cheaper than dynamite, but its manufacture and use must be attended with considerable danger. — (*Chem. techn. rep.*, 1883, 154.) C. E. M.

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METALLURGY.

Gaseous fuel in iron manufacture. — Mr. W. S. Sutherland read a paper before the British iron and steel institute, on the production and utilization of gaseous fuel in iron manufacture, in which he claims that the seams of boilers can be welded instead of riveted, if the heat can be applied uniformly, and of sufficiently high temperature, without excess of air or admission of dirt. This kind of heat he has obtained only by the use of coal-gas, Siemens-producer gas, or water-gas, the preference being given to the latter. To secure the requisite air in constant proportion, the gas being in excess, gas and air are mixed before combustion; probably the first instance of such a utilization of the principles of a Bunsen burner on a large scale. Explosions are prevented by having an outlet lightly covered by india-rubber, at some corner of the main; and when the wave, or disk of flame, which does not readily turn a corner, reaches this cover, it breaks the rubber just as a blow would. The method has been worked some ten years without accident. From all his experience, Mr. Sutherland concludes, that to produce a good, true, wrought iron, Siemens gas with varying proportion of air, instead of air alone, should be blown into the iron in the Bessemer converter. — (*Eng. min. journ.*, July 14, 21.) R. H. R.

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Nickel extraction. — Prat and Laroche of Bordeaux add powdered nickel ore to a bath of sulphuric acid 56° to 66° Baumé: on stirring the mass it becomes heated, and in half an hour it is nearly solid. The soluble salts of the metals, thus formed, are leached out with boiling water. From this solution,

oxalate of nickel is formed by boiling with oxalic acid; the precipitated oxalate of nickel is boiled with caustic soda, yielding oxide of nickel and oxalate of soda. The oxalic acid is recovered from the latter salt. — (*Eng. min. journ.*, June 2.) R. H. R.

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The Doetsh copper extraction process. — This process has been in use by the Rio Tinto mine for some years. The ore is crushed to .4 inch in size, and piled in heaps forty-five feet wide, with suitable channels at the bottom, and vertical draught-holes. About two per cent of salt is sprinkled over the top. A basin thirty feet square is made on the top of the heap, and the regenerated liquors from the last operation are run into it. The dissolved and leached copper is precipitated by scrap iron, the iron liquors remaining are regenerated by sprinkling them down through a coke tower, while mixed chlorine and hydrochloric acid are forced upward. — (*Eng. min. journ.*, July 14.) R. H. R.

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MINERALOGY.

Picro-epidote. — MM. Damour and Des Cloizeaux have investigated a gray crystalline mineral from Lake Baikal, and found it closely related to epidote in crystalline form and optical properties. A complete chemical analysis was not made; but qualitative tests proved it to be a silicate of alumina and magnesia, with only a trace of calcium. It is supposed to be a magnesium epidote, and the name 'picro-epidote' is proposed for it. — (*Bull. soc. min.*, vi. 23.) S. L. P.

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Jeremeieffite. — A new mineral from the Soktoui, south-east of Adun-Tschilon in western Siberia, has been described by M. Damour. It occurs in nearly colorless, transparent, hexagonal prisms, thus resembling some varieties of beryl and apatite. Hardness, 6.5; specific gravity, 3.28. Qualitative analysis proved it to be essentially a borate of alumina. Before the blowpipe it is infusible, loses its transparency, and colors the flame green (boron); with cobalt solution, it assumes a blue color. It is insoluble in acids, except after strong ignition, when sulphuric acid dissolves it. Chemical analysis yielded B_2O_3 , by difference (40.19) . Al_2O_3 (55.03) . Fe_2O_3 (4.08) . K_2O (0.70) = 100%, from which the formula $(\text{Al}, \text{Fe})_2 \text{B}_2\text{O}_6$ is derived. It is named after the Russian mining engineer, Mr. Jeremejew. — (*Bull. soc. min.*, vi. 20.) S. L. P.

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METEOROLOGY.

Bavarian meteorology. — The quarterly publications of the meteorological stations in Bavaria deserve special mention for the model way in which the observations are recorded, and for the excellent discussions which accompany them. The concluding number of the series for 1882 contains a monograph by Dr. Lang upon the observations at Munich for sixty-seven years. Among the results reached is that the mean pressure for any day can be better obtained by taking the mean of the observations at six A.M., two and ten P.M., than by any other of the eight different combinations tested. The mean of the maximum and minimum for the day gives in general nearly as good a result. Similarly of the tempera-

ture, the best combination is the mean of the seven A.M., two and nine P.M. observations, but the mean of the maximum and minimum is nearly as good. — (*Beob. met. stat. in Bayern*, iv. 4.) W. U. [251]

Rainfall at Hawaii.—The meteorological conditions of the island of Hawaii are so peculiar, that, though the island is not large, in one portion rain seldom falls, and the land is a desert; while in another the rainfall is so excessive that it is said it should be measured, not in inches, but in feet. In proof of the excessive rainfall, the following figures have been furnished by Dr. C. S. Kittredge of Hilo, Hawaii. The observations were made by Dr. Wetmore at Hilo.

Rainfall at Hilo, Hawaii.

	1880.	1881.	1882.	1883.
	In.	In.	In.	In.
January	—	5.1	36.7	3.1
February	—	3.1	23.6	23.1
March	—	55.2	18.7	2.4
April	14.5	8.3	5.2	12.4
May	6.9	4.2	7.0	—
June	8.1	10.8	7.1	—
July	22.1	9.9	7.9	—
August	7.3	8.8	7.0	—
September	14.5	8.2	8.6	—
October	15.7	4.9	6.9	—
November	3.6	21.7	20.4	—
December	3.1	34.2	15.7	—
Sums	—	174.4	164.8	—

For the three years April 1, 1880 to April 1, 1883, the total amount is 463.6 inches, averaging 154.5 inches each year. — W. U. [252]

GEOGRAPHY.

(*Arctic.*)

North-west America.—Reports from the island of Kadiak, Alaska, state that the spring has been unusually late, and on the 6th of June summer seemed to have just set in. During the preceding three months, the rainfall had averaged eleven inches per month. Salmon-canneries had been established at Karluk, on the island of Kadiak, and at Seal bay, Afognak island. On Cook's inlet, a cannery had been established at the Kassilax river. Exploring parties were examining the shores of the inlet for minerals. One party was ascending the Sushitno river, where Doroschin reported gold many years ago. Another party had sailed for Kamishak bay, Alaska peninsula. An experiment in sheep-raising has been going on, on the island of Kadiak, for three years. Success seemed certain, as the wool improved in quantity and quality, and was free from burrs and impurities. In adding to the number, an epidemic disease was introduced; and of the flock of three hundred, only about thirty survived. — Rev. S. Hall Young has been making a study of the religious belief of the Tlinkit Indians of the Alexander archipelago, which will shortly be made public. — The U. S. revenue-steamer *Corwin* left Sitka on her Arctic cruise, June 16. — At Juneau City, the largest shipment of gold-dust ever made was sent by the June steamer. The troubles among the miners here have caused many to depart. It appears that

the rock containing the gold is of a loosely crystalline or granular nature, which weathers to a gravel. The lighter portions of this wash away in the rains; but the gold settles down into the remainder, which becomes much richer than the original rock in equal quantities. This gravel is said to exist on the upper parts of the auriferous mountain-belt. Prospectors claim this gravel as placers, and desire to work it under the law governing placer-mining. The companies who have taken up quartz-claims desire to have it regarded as quartz or vein mineral: hence the conflict, which was to have been settled by the officers of the U. S. S. *Corwin*. The decision has not been made public. — Prospectors have gone to explore the country about Yakutat bay, where the Indians have hitherto been hostile. Reports as to its richness in gold have long been prevalent; but so many have met their death from the natives, that hitherto no one has dared attempt exploration. The party consists of five men, with six months' provisions, and was transported by the U. S. S. *Adams*. The prestige of the naval vessel, it is hoped, will afford them protection. — The schooner *Alaska* has sailed from San Francisco, for Golovine sound, Alaska, taking with her a small stern-wheel steamer and a complete mining equipment and some twenty-five miners. The mines are situated on the Fish river, which forms part of the water-communication between Grantley harbor and Golovine sound. It is stated that the ore is a very rich argentiferous galena. The parties engaged in the enterprise have been several years investigating the deposit, and feel sufficiently encouraged to begin a regular prosecution of the business. In this vicinity, graphite is known to occur in a sienitic rock, in considerable quantities. This will be the most northern mine actually worked in the western hemisphere. — W. H. D. [253]

(*South America.*)

Bove's new expedition.—Lieut. Bove proposes a new expedition to complete studies begun during his last journey in the southern part of the Argentine republic. He proposes to investigate the present physical and economic condition of the country, with a view to closer commercial relations with Italy. He will take up the exploration of Patagonia and Tierra del Fuego, especially the basin of Santa Cruz, the canals of western Patagonia, and the habitable country extending from the Ona to the Cioniu Chonos. The inhabitants are totally unknown. The explorer has placed himself at the disposition of the Argentine government for the purpose of placing light-houses on Staten island and other points needful for navigation, an arrangement which will facilitate the prosecution of his other investigations. For transportation he will depend partly on the English missionary board, who have promised co-operation, and will afterward equip for exploration one of the small vessels always obtainable for such purposes either at the Falkland islands or Punta Arenas. The journey will occupy a year, and cost about five thousand dollars. — (*Revue géogr.* June, 1883.) W. H. D. [254]

BOTANY.

Ellis' North American fungi.—Dr. Farlow, who edited the third and, in part, the eleventh century of this collection, contributes valuable notes on some of the Peronosporae and Uredineae so far distributed, with some pertinent remarks on the nomenclature of the latter group. Though desirous of retaining the earliest specific names wherever practicable, the writer does not believe, with Winter, in applying the name given to the *Aecidium* of a *Puccinia* or other teleutosporic form to the species, when its several stages are grouped under the generic name of the latter form. "For practical reasons, if for no other, the custom of substituting an aecidial specific name, for a name given to a *Uredo* or teleutosporic form, should by all means be avoided. Of all the Uredineae described by older writers, probably none are more difficult to determine satisfactorily at the present day than the species of *Aecidium*, so called. Original specimens of that genus are, as a rule, not so well preserved as those of other genera of the order; and, if one usually gets little satisfaction from examination of what is left of the original types, he is scarcely better off on reading the older descriptions. It was not unfrequently the habit of older mycologists, to describe as varieties of one *Aecidium* forms found on the most diverse plants; and most certainly it is going too far to substitute for the name of a *Puccinia*, let us say, which has passed current for many years, the name given by an old authority, like Persoon or Link, to what he considered a variety of an ill-defined *Aecidium*. It cannot be said that any want of respect to the older writers is shown by abandoning their aecidial names in such cases."

With respect to the *Uredo* name, however, the case is held to be somewhat different. "As a matter of fact, the types of the earlier-described *Uredo* forms are much better preserved than *Aecidia*, and examinations of older herbaria frequently enable one to determine with accuracy what form was meant by an older author. Furthermore, the *Uredo* and teleutosporic forms frequently are found together in the same sorus, or in close proximity; and examinations of authentic specimens often show the relation of an old-described *Uredo* to a more recently described teleutosporic form. The most important consideration, however, is the following. Many of the forms now recognized as teleutosporic have one-celled spores, and were originally described as forms of *Uredo*; and, in such cases, one must go back to the original specific names." He adds, however, "If I have advocated retaining the older *Uredo* name in cases where we know with certainty what was meant by the earlier mycologists, I have by no means intended encouraging the use of names about which there is doubt, either from the absence of typical specimens, or confusion of several species by older writers. Rather than favor that method—if one may say so—of forcing priority, I should prefer to give up the substitution of all old *Uredo* names, except, possibly, in the case of species now referred to *Uromyces*." The use of the parenthesis for the original authority for the species, though somewhat

cumbrous and generally discarded by phenogamic botanists, is, on the whole, advocated, especially since the genera of fungi are often not very definitely fixed. "A species of Fries, for instance, may, during five years, be dragged through no one knows how many new genera; and it is with a mildly malicious satisfaction that one sees those modern writers who adopt minute generic subdivision, forced by the prevailing custom to add the '(Fr.)' as a slight tribute to the past."

Besides the characters of eight species, previously nondescript, the notes also contain much critical information concerning the synonymy of many of the species, and the geographical distribution of others. An interesting fact is the preponderance, among our Peronosporae, of species germinating by the production of zoospores, though this would appear to better adapt them to an insular climate than to ours, which is a continental one, subject to extremes of heat and moisture. — (*Proc. Amer. acad.*, May 9, 1883.) W. T.

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ZOÖLOGY.

Crustacea.

Parasite of the salmon.—Carl F. Gissler in an anonymous article, in the *American naturalist* for August, describes and figures, as a new species of *Caligus*, a parasite of the salmon of Puget sound. The species is probably *Lepeophtheirus salmonis*, which infests the salmon upon both sides of the North Atlantic. — S. I. S.

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Brachyura and Anomura off the coast of New England.—In a preliminary report on the *Brachyura* and *Anomura* dredged in deep water off the south coast of New England by the U. S. fish commission in 1880-82, S. I. Smith enumerates thirty-one species taken in sixty-five to six hundred and forty fathoms, and gives full descriptions and figures of the new forms discovered. The report, although only a supplement to a notice of the crustacea dredged in the same region in 1880, describes three new genera and seven new species. Of the thirty-one species enumerated, only four were known from the south coast of New England previous to 1880, and more than half of the whole number were new to science; and yet none of the species belong to the abyssal fauna proper, and nearly all of them were taken most abundantly in less than two hundred fathoms. The dredgings off Martha's Vineyard in 1882 revealed the total, or almost total, disappearance of several of the larger species of crustacea, which were exceedingly abundant, in the same region, in 1880 and 1881. The disappearance of these species was apparently connected directly with the disappearance of the tile-fish (*Lopholatilus*) from the same region; and on this account complete tables are given of the specimens examined from all the dredgings in the region in question. Five species, which were exceedingly abundant in 1880 and 1881, were not found, or found only very rarely, in 1882; and five others, taken several times in 1880 and 1881, were not taken at all in 1882. These species were specially characteristic of the narrow belt of comparatively warm

water, — in sixty to one hundred and sixty fathoms, — which has a more southern fauna than the colder waters either side. Professor Verrill has suggested that there was a great destruction of life in this belt in the winter of 1881-82, caused by a severe storm agitating the bottom-water, and forcing outward the cold water that occupies the great area of shallow sea along the coast, thus causing a sudden lowering of the temperature along the warm belt.

Among the forms described are two new genera of Galatheidæ, in one of which there are no appendages on any of the first five abdominal somites of the adult male. But the most interesting forms are two genera of hermit-crabs, — *Parapagurus* and *Sympagurus*, — in which the branchiæ present types of structure intermediate between the phyllobranchiæ of ordinary paguroids, and the trichobranchiæ of the Astacidae, etc. — (*Proc. nat. mus.*, vi., June, 1883.) S. I. S.

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VERTEBRATES.

Development of muscle fibres and their union with nerves. — Although very numerous researches have been made on the differentiation of striped muscles, and on the termination of their motor nerve-fibres, yet the multifarious observations have often been too incomplete to lead to any but conflicting and unsatisfactory theories. An important contribution toward reducing this unfortunate and excessive confusion to order is made by L. Bremer, who has studied the post-embryonic changes in lizards, frogs, and mice. The nucleus of the muscle-fibre, together with the protoplasm surrounding it, constitutes the so-called muscle-corpuscle; the corpuscle is much more prominent in young than in old muscles, for its protoplasm is gradually differentiated into muscular substance; a small number of corpuscles enters into the formation of each fibre; the substance of the muscle forms a network, which was first partially recognized by Heitzmann (*Wien. sitzungsber.* xvii. abth. 3, 1873); the meshes of this network appear polygonal in transverse, rectangular in longitudinal sections; the network is a modification of the protoplasmatic network of the corpuscles, and is so arranged that there are alternating rows, both transverse and longitudinal, of fine knots and large knots (corresponding to the fine and broad striæ); the fine knots are connected by fine threads, and the large knots by coarse threads; hence there is a fine and a coarse net.

The post-embryonic multiplication of fibres takes place by means of the structures described by Margo (*Wien. sitzungsber.* xxxvi. 229) under the name of 'sarcoplasten'; there are lines or chains of muscle-corpuscles, united by the protoplasm net, and derived by proliferation from the corpuscles of the original fibres; the sarcoplast gradually separates from the parent fibre, undergoing muscular differentiation meanwhile, and also becoming connected with the nerve. The growth of the fibre is initiated by a multiplication of the corpuscles; the sarcolemma is not present at first, but appears later, being probably formed by the fused cell membranes of the corpuscles, to which appears to be added a coat of connective tissue, and also around the motor plate between

the two sarcolemmic coats, an extension of Henle's sheath of the nerve.

The motor nerve plates are formed as follows: When the sarcoplast begins to change to muscle, the nerve grows towards it until the two meet and unite. In lizards only a single nerve-fibre, in the frog and mouse several together, thus approach the future muscle. At the point of contact, the muscle-corpuscles change, so that an accumulation of protoplasm and a proliferation of nuclei occur there. These accumulations were first described by Kühne under the name of 'muskelspindeln' (*Virchow's arch.*, 1863, 116), and are mentioned by many subsequent writers: Bremer now shows that they are young 'end-plates.' Into these the ramifications of the nerve penetrate, after the medullary sheath has been lost. The details of the process, of course, vary in different animals, as do also the final forms of the motor plates.

Besides the motor terminations, there are others, which the author believes to be probably those of the sensory nerves. The fibres running to them are either small and medullated, or naked and end in ramifications upon the muscle, without any conspicuous collection of nuclei and protoplasm at the place of junction. The smaller nerve endings occur on the same fibres with the motor plates, and probably both exist on every fibre. The smaller endings, Bremer designates as 'enddolden' in contradistinction to the 'endplatten.' (Sach's paper on the sensory nerves of muscles is not cited by Bremer.)

Hensen has advanced the view that the connection between the nerves and the peripheral cells exists from the first in the embryo, and that, as the cells divide, so do the nerves. Bremer's observations show that with muscles this is not the case. Moreover, Kleinenberg's theory of the evolution of muscle and nerve must be at least modified, if not set aside. (That the union of the nerve-filament with the peripheral organ is secondary, is shown also by His, *SCIENCE*, i. 956.) — (*Arch. mikr. anat.* xxii. 318.) C. S. M.

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ANTHROPOLOGY.

Folk-lore in the Panj'ab. — Mrs. F. A. Steel is collecting the folk-stories among the natives in the Panjâb. No. 18 is a charming shepherd-tale common among the cattle-drover's children in the forests of the Gujrânwâlâ. It is about Little Ankle-Bone. Once upon a time a little shepherd was eaten by a wolf, that hung the ankle-bone of his victim to a tree. Some robbers, dividing their spoil, were startled by the falling of the bone, which became a little lad, and did many wonderful things, taming all the beasts of the field, and fowls of the air. He changes a pond into milk, by the side of which he sits under an oak-tree, playing his shepherd's pipe, while all the animals come to listen, and to drink out of his marble basins. The series will be continued. — (*Indian antiquary*, xii. 105.) J. W. P.

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Lorillard City. — After his researches at Chichen-Itza, M. Charnay made an excursion into the country of the Lacandones, — a fierce, indomitable tribe, of whom it is most desirable to have more information.

M. Charnay found the ruins of an ancient city, which he named after his generous patron. In his explorations here, he was assisted by a young Englishman, Mr. Alfred Maudslay, with whom he shares the honor of discovery. The town is about 17° N., on the left bank of the Usumacinta, on the boundaries of Guatemala and the two Mexican provinces of Chiapas and Tabasco. The ruins resemble those of Palenque in the material, arrangement of interiors, decorations, and glyphs. The great stone slabs of Palenque carved with inscriptions and bas-reliefs, are replaced here by lintels covered with superb sculpture (cf. i. 1008.)—(*Proc. roy. geogr. soc.*, v. 44.) J. W. P.

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Shaking towers.—Col. Lovett, in his journey through northern Persia, visited the shrines of some dervishes, near which is a minar, curious for possessing the same property that makes the shaking towers of Ispahan famous. When shaken by a man standing on the top, it oscillates sufficiently to cause a brick placed on the edge of the cornice to fall. It is about thirty-five feet high, and six feet diameter at the base, tapering gently upwards. This property of vibrating is attributed at Bostam, as it is at Ispahan, to miraculous interposition of the local saint. It is, of course, due to the elasticity of the bricks and cement used, the latter becoming more elastic with age.—(*Proc. roy. geogr. soc.*, v. 80.) J. W. P.

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Explorations in Guatemala.—Mr. A. P. Maudslay, mentioned in M. Charnay's researches, has published separately some of his own personal explorations, with a map and ground-plans. Starting from Livingstone, Guatemala, he first visited Quirigua, whose ruins consist of raised mounds and terraces, usually faced with stone, and near to these, carved monoliths. The latter are of two kinds: high upright stones, ornamented with human figures and tables of hieroglyphics; and low broad stones, in the shape of some animal. The first named measure three to five feet across, and 12 to 25 feet out of the ground. On both back and front, the principal ornament is a human figure in relief, decked out in the barbaric splendor usual throughout Central America. Mr. Maudslay suggests that the inevitable human face on the thorax may explain the function of the great number of masks from this quarter. The second class of carvings is very interesting. One specimen, weighing about eighteen tons, represents a turtle having a human head, with projecting ears richly ornamented. In place of the tail is the life-sized figure of a woman sitting cross-legged, and holding a manikin sceptre in her hand. The whole surface of the block is profusely ornamented. Nowhere in the neighborhood are there traces of houses. The exploration at Quirigua led to an attempt to fix the site of Chaciyal, mentioned by Cortez.

Leaving this spot, Mr. Maudslay visited Copan, where the sculptures impressed him as being above those of Quirigua in execution. From Copan our traveller wandered next to Tikal, north-east of Lake Peten, only once before visited by a foreigner, Bernouilli. All the houses here are built of stone, and

coated with plaster. Inside, the walls are seven to eight feet high, and the stone roof forms a narrow gable. The rooms within are very narrow, resembling long passages. The town was laid out in a rectangular form, the slopes terraced with sustaining walls. The houses are often built on raised foundations, stone-faced in the same manner. The most imposing buildings are the five temples raised on pyramidal foundations, in front of which are steep stairways leading up to the doors of the temples. There is no trace of any idol or object of worship in these buildings, but carved slabs and circular altars are found in the plaza. The next point of interest was a ruined town on the Usumacinta. On the top of a steep bank 60 feet high stands the first row of houses, and the town is built on a succession of stone-faced terraces reaching more than 250 feet in height. Instead of the long, narrow interiors as at Tikal, the houses are broken into a number of recesses by buttresses supporting the roof at intervals, and stone is used instead of sapote-wood for lintels. One of the houses at Usumacinta is minutely described by Mr. Maudslay. In nearly all the houses, around the idols, stand earthen pots partly filled with some resinous substance, which the Lacandon Indians probably placed there, showing that the old faith has not died out. At this point Mr. Maudslay met M. Charnay. This very important paper closes with a short sketch of the Lacandones.—(*Proc. roy. geogr. soc.*, v. 185.) O. T. M.

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NOTES AND NEWS.

News of a serious character has been received from the Greely relief expedition. The Proteus and Yantic sailed from St. Johns, Newfoundland, June 29. They arrived safely at Disco on the 6th and 12th of July respectively. The Proteus with Lieut. Garlington and the relief party, with supplies, etc., sailed from Disco for Cory island, arriving on the 16th. On the 21st she started for Smith sound, and reached a point in latitude 78° 52', longitude 74° 25' W., a few miles north and west of Cape Sabine, where she was beset and crushed in the pack. The party succeeded in saving boats and provisions sufficient to sustain them during their retreat, and made their way across Smith sound and along the eastern shore to Cape York, and reached Upernavik on the 24th of August, all well. Records had been left at Littleton island which apprised the Yantic, on her arrival, of the disaster. A search was immediately instituted, and on reaching Upernavik, Sept. 2, it was found that the Proteus party, after suffering severe hardships, and traversing six hundred miles of the Arctic sea, had arrived in safety. No news was obtained of the Greely party, no supplies had been landed for them, and their situation must be considered as grave. Some rumors had reached the Danish settlements by parties of Eskimo, which, however, are not to be considered as of any weight; and there is yet no reason for supposing that any ill fortune, further than the loss of anticipated supplies, has befallen Lieut. Greely and